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NAVAL SUPPLY SYSTEMS COMMAND

NAVSEA AIDC Steering Group Meeting

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Navy AIT KM/CoP Pilot - www.cop.saic.com

Ready. Resourceful. Responsive!

September 24, 2003

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Agenda

- Navy AIT Roles & Responsibilities
- Current Efforts
  - *RFID Policy, COMCOM Requirements & OPNAV Position*
  - *DoD RFID ITV Pros/Cons*
  - *Industry RFID Advantages/Disadvantages*
  - *Navy Technology & Data "Detours" Roadmap*
  - *What is RFID (Active vs. Passive Tags)?*
  - *RFID Stages. . .Crawl, Walk & Run*
  - *RFID Process & Frequency Bands*
- Initiatives
- Upcoming Events
- Summary

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Automatic Identification Technology

" AIT is a suite of technologies that enable the automatic capture of source data, thereby enhancing the ability to identify, track, document and control deploying and redeploying forces, equipment, personnel and sustainment cargo. "

1997

AIT devices can automatically identify, locate/ track, and monitor supplies and equipment

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Who is responsible for AIT in Navy?

Other N4 Codes Involved.

OPNAV N4
Fleet Readiness & Logistics

OPNAV N41

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Navy AIT Steering Gro

- *Fleets*
- *HSCs*
- *SPECWAR*
- *Seabees*
- *BUMED*

Navy AIT Supporting Organizations:

NAVSEA/NSWCCD

NSWC, NAWCAD, CDA

NAVSUP is responsible to oversee implementation of Navy AI

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Navy AIT Project Office Roles & Responsibilities

"AIS PM Customer Support on AIT/AIS integration to provide accurate, timely & usable information for Total Asset Visibility to improve Navy-wide logistics processes, enhance operating force readiness & reduce the cost of logistics"

- **Navy-wide AIT Policy**
- **Develop & put into effect Government/Commercial Standards**
- **Promote AIT use in tracking ALL Classes of Supplies across ALL Supply Chain business processes**
- **Educate PM's on AIT/AIS integration & lifecycle support budget requirements**
- **Evaluate Technology for integration to Navy Business Processes**
- ***SECNAVINST enforces DoN-wide AIT policy supporting Navy AIT Vi***

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AIT Framework

AUTOMATIC IDENTIFICATION TECHNOLOGY

What is AIT?

- AIT captures, aggregates, and transfers data to information systems
- Navy AIT accepts commercial / DoD marking and labeling standards applied by the manufacturer

AIT Media

- Bar Coding
- Radio Frequency
- SMART cards
- Biometrics
- Contact Memory Buttons
- Optical Memory Cards
- Personal Digital Assistants
- Micro-Electrical Mechanical Systems

RAW DATA

HOW AIT WORKS

Transfer to Handheld

Convert data

DATA CARRIERS

- Radio Frequency (RF) Tag
- RF Chip
- Contact Memory Button
- Data Matrix
- 2D Barcode
- Linear Barcode UPC

COST

DATA READERS

- RF Interrogator
- Contact Memory Button Reader
- Data Matrix
- 2D Barcode
- Linear Barcode

Automatic Identification Systems

- ERP
- UICP
- RSupply

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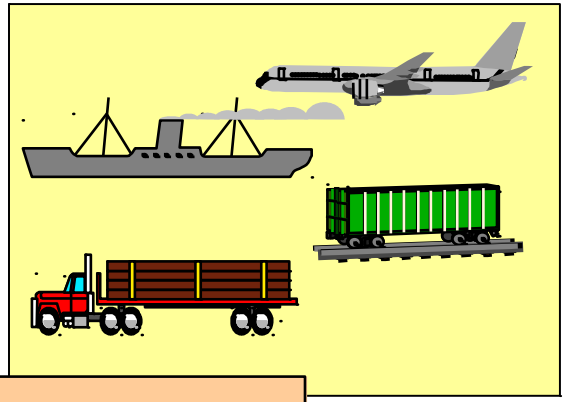
AIT Identification, Location and Tracking

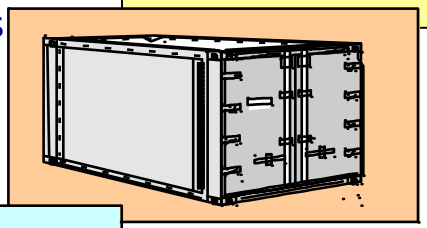
Identification Options for System-wide Visibility

Supply Chain Marking

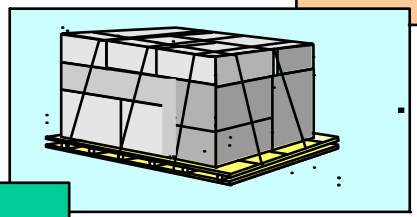
CONVEYANCE
- Bar Code 2D Labels
- RFID Tags
- Satellite
- GPS Capability
- Cellular



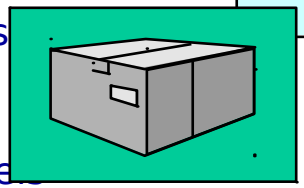
CONTAINER
- Bar Code 2D Labels
- RFID Tags
- CD's



PALLET
- Bar Code 2D Labels
- RFID Tags
- CD's



MULTIPACK
- Bar Code 2D Labels
- Embedded RF Chip
- CD's



PART
- UID Data Matrix Bar Code 2D Label
- ePC (Food/Medical)
- Cage/UPC, Serial & Part/Lot Number
- Laser etching, dot peen, ink, plastic

Enables TAV & Support Tools for the Warfighter

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Top 5 Efforts

- SECNAVINST for AIT Roles & Responsibilities
  - *OPNAV Interim Policy Message Released – Jan 03*
  - *SECNAVINST at OPNAV N41 for routing & signature*
- DoN AIT Instructional Guide for AIS owners
  - *DoD AIT Reference Manual (providing Navy specific details)*
  - *Living guidance document – jointly developed by DLA & all services*
- NAVSUP Joint AIT Initiatives Plan Candidates defined – CRB unapproved
  - *Shipboard Movement Tracking (SMT) with USMC*
  - *Engine Container Tracking (NAVICP) RFID tags to other service*
  - *FMS using DLA's Automated Manifest System (AMS)*
    - Initial effort funded in FY02 by Navy AIT
- Develop Navy policy - Unique Item Identification (UID) - www.uniqueid.org
- *Policy before technology…standardization before implemen*

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Navy AIT Project Office Long Term Goals

- Coordinate development of Navy UID Implementation Plan (with Echelon II Commands)
- Support ERP implementation of AIT
- Update Navy AIT Instructional Guide
- Support DoD AIT Reference Guide
- Navy AIT Steering Group Meetings (Feb/June 2004)
- Manage execution and final reports for FY03/FY04 AIT prototypes
- Migration of KM-COP from commercial site behind Navy domain and to (NAVSISA) Sitescape product
- Provide Navy support all the various DoD/Service level conferences and briefings (acquisition-to-disposal & all 35 E II commands participation)
- Completion of the UWB container tag development
- Develop Navy RFID Implementation Plan
- Define Navy requirements for DoD AIT contracts w/Army Executive Agent

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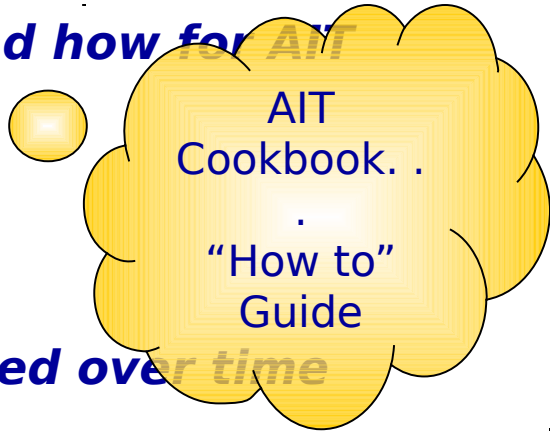
DoN AIT Instructional Guide

- **Background:**
  - *Navy AIT Project Office developed first edition of Navy AIT Instructional Guide*
- **Layout:**
  - *Answers who, what, when, where, why, and how for AIT*
  - *Defines Data Requirements & Structure*
  - *AIT Media Types*
  - *Standards*
  - *Sample contract requirements*
  - *Living document – will be expanded/updated over time*



- **Status:**
  - *Posted to KM/CoP website* www.cop.saic.com
  - *Working with DoD Logistics AIT Office to:*
    - Incorporate all Navy requirements into web-based DoD AIT Reference Manual
    - Develop content & DoN unique requirements

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Navy AIT Knowledge Management/ Community Of Practice (KM/COP) Pilot

- **Background:**
  - *DoN CIO sponsored initiative with NAVSUP*
- **Status:**
  - *Prototype Site (www.cop.saic.com) & Training Available*
  - *Transition from Tomoye to Sitescape software – due Jan 04*
  - *DoD AIT Office buy-in*
  - *After Prototype – Jan 04 - Develop MOUs with other Services*
- **Issues:**
  - *Requires collaborative participation & effort from AITcommunity*
  - *Requires demonstration to other Service/DoD AIT Offices at prototype conclusion*
  - *Coordination effort of various services AIS's & business process owners*
  - *Requires content management to assure meaningful data is available for AIT community members*

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DITSCAP, HERO, NMCI

- **FY04 AIT PO funding NAVSISA to develop a generic AIT DITSCAP template document.**
  - ***Template can be incorporated in AIS DITSCAP documents of Navy/Marine Commands.***
- **HERO Testing & Certification - KM/CoP (under Hardware)**
  - ***Preliminary stand off distances loaded***
  - ***NOSSA re-evaluated NALC – stand off distance for Symbol 7240***
- **Requested DoD PM AIT consider AIT III contract to include NMCI tested & certified products.**
- **Tasked to provide NMCI the Navy AIT Implementation Plan of DoN AIS's Implementation status/future plans.**
- **Continue to coordinate DoN position with NMCI/SPAWAR Eagle Team to allow continued DoD AIT contract purchases & provide NMCI testing lab with vendor products for NMCI testing and certification**

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USD (AT&L) RFID POLICY (Due - Sep 03 - now July 04) & CENTCOM Requirements

- Active RFID Data-Rich Tags supporting COMCOM requirements for
  - > License Plate Data Tags on Containers/Pallets for: Prepositioned & War Reserve Material, Ammunition, Unit movements (i.e., deployments) & Sustainment.
  - RFID Tag Data File Management (i.e., Army ITV servers)
    - *Issue - No reconciliation of data between GTN &JTAV data*
  - RFID Infrastructure Purchase & Maintenance
  - Working Groups Identified to Resolve Issues & Finalize Policy
- Passive RFID Capabilities (ePC efforts, etc.)
  - *Developing requirements, candidates & areas for DOD Supply Chain Implementation*
    - Criteria will be effectiveness & high ROI
  - *Developing way ahead*

Presented to JLB Sep 18, 2003

Incorporate into Appropriate DOD Policy Documents

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Navy (OPNAV) Position On RFID

- Navy supports RFID to provide ITV - where it is cost effective & consistent with readiness requirements.
- Navy does not support Service-wide investment in, & adoption of RFID as the "only means" to generate ITV data.
- Navy has ITV on Cargo Shipped between POE & POD in Global Air Transportation Execution System (GATES) & Worldwide Port System (WPS) interfaced to Global Transportation Network (GTN).
  - *RFID Read/Write Capability - Norfolk Ocean Terminal*
  - *RFID Read Capability - Fujariah & Bahrain Air Terminals*
- OPNAV tasked Navy AIT PO to identify stakeholders & impact of Navy position on Active RFID ITV requirements – JLB held 18 Sep
- Status:
  - *Sep 4 - VTC w/EII impacted stakeholders*
  - *OPNAV N6 Security/data encryption issues to be addressed*
  - *Navy RFID Implementation Plan under development – draft due 12/04*

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DoD RFID For ITV

Pros

- Provide remote warfighter ability to have stand-off in-the-box visibility through GTN/JTAV servers
- Ability to support warfighter operations more effectively and efficiently
- Expect FY04/05 Joint Interoperability & RFID Standards (not there today)

Cons

- Infrastructure Cost (Army investment $5M/year)
  - *Tags ($99/ea), mounts, interrogators, hand-helds, SCRs, Comms, training & life cycle maintenance*
  - *30% Accuracy Rate*
- DLA Tag Management (Active Tags – non-disposable)
  - *Status: Only 7% of tags being returned to DLA/DDC (300K of tags)*
  - *DLA cost recovery rate is 9.9% to services ($108.80/ea)*
- USTRANSCOM, DLA (movement unit) rates will increase:
  - *Navy should not pay other Services logistics bills*

Technology Alone Does Not Fix A Broken Business Process

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Industry - RFID Advantages & Disadvantages

- **Typical return on investment (ROI) for RFID implementation ranges from 15 – 40%**
  - ***Does not consider impact of correcting the 10 –25% of errors entered into the database***
- **RFID does not have 100% read accuracy**
  - ***80% accuracy from an engineering perspective***
  - ***95% accuracy from a marketing perspective***
  - ***Finding these errors decreases effectiveness & efficiencies***
- **Highly selective RFID application can result in greater ROI:**
  - ***Tagging a small percentage of relatively inexpensive items may be good "first" approach***
- **Business Case Analysis must be done to prove savings after initial prototype**
- **RFID does not make sense for every functional application**
- **Currently - commercial industry RFID use is on "case and pallet" items – not on line items or large containers**

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Technology Roadmap/"Detours"

- **Minimal Navy AIT Bar Coding Policy for ALL Material:**
  - ***1D/2D PDF417 for Packaging (Military Shipping Labels/Movement Documents)***
  - ***2D Data Matrix for Parts (OSD UID implementation support)***
- **Successful Bar Code implementations supported:**
  - ***AIS's (Shore) – CAV, CAV-ORM, LCAV, OIS, SNT, FMS, ECT, RRAM, FSM***
  - ***AIS's (Afloat) – IBIS, RSUPPLY FORCE, MICROSNAP, NEMAIS, CDMD-OA, DC-OSIMS***
- **RFID Implementation must be:**
  - ***Coordinated throughout Navy to support infrastructure (interrogator installation/tag purchase)***
  - ***Based on collaborative Navy RFID Implementation Plan (EII commands) expected to read/write tags***
  - ***Based on "inexpensive" RFID Tags***
  - ***Fill a "gap or seam" in existing TAV***
  - ***Focus on "Data" to be captured not the "Hardware" device***
  - ***Limit data-rich RFID Tags to specific purposes (e.g. active tags on engine containers)***
  - ***Apply Data Security measures, encrypted data where required, meet FIPS-140 requirements.***
  - ***HERO tested & certified***
  - ***Able to use Non-Proprietary Protocol for Tag Communications***
  - ***Operational on frequency spectrum approved by varied foreign countries & compliance with ISO/ANSI standards.***

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Data Roadmap/ "Detours"

- **OSD UID – policy published July 03:**
  - ***OSD Pilots underway - Army CH-47 & M1, AF – C17***
  - ***Collaborative Navy UID Implementation Plan with EII commands***
  - ***Stakeholders - Identify Parts to be "Marked" & Contracts to be Modified or Marking Requirements for New Contracts – due Jan 04.***
- **ePC Global announced last week** http://www.uc-council.org/epcglobal/
  - ***Combines EAN International and Uniform Code Council (UCC)***
  - ***DoD moving toward use of ePC - 96 position data identifier - used commercially (contains manufacturer, product, version & serial number)***
  - ***Will not fit in DoD standard transactions used today – requires business process change***
  - ***MIT Auto-Id Center will become Auto-Id Labs & work closely with ePC Global***
  - ***DoD partnerships established with Auto-Id & Wal-Mart***
- **NATO Standards Incompatibility**
  - ***NATO agreement uses 18 position numeric tracking number "versus"***

Document/Requisition/Transportation Control Number alpha-numeric numbers used throughout DoD today.

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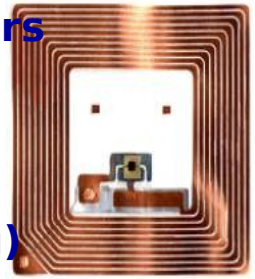
What is RFID (Active vs. Passive Tags)?

Characteristics	ACTIVE (non-disposable) Higher Cost, Larger Size	PASSIVE (disposable) Thin, low cost
Energy Source:	Battery	Induction
Read Distance:	5 to 300 mete	approx. 6 meters
Memory:	64K-228K	64 bits – 8K
Life Time:	2 to 7 years	up to 10 years
Tech Maturity Level:	Low	Medium
Weight:	50/>200 grams	.5 gram (excl. pckg)
Cost:	$20 - $100+	$.30 - $5



- **Active & Passive Characteristics:**
  - ***Transmits and receives data***
  - ***Utilizes computer chip and antenna***
  - ***Range in capabilities from simple, unique 'license plate' to encryption, memory & read/write capability***

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RFID Evolution, Not Revolution

Crawl

- *Focused on quick wins, inside the enterprise & with close trading partners*
- *Tags at pallet, case or tote level*
- *Examples include:*
  - Reusable Asset Tracking
  - Remote RFID generation
  - Receiving
  - Shipping
- *Primary benefits:*
  - Improved productivity
  - Inventory accuracy
  - Inventory visibility

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RFID Evolution, Not Revolution

Walk

- Synchronizing processes & data across multiple enterprises
- Tags at pallet, case or tote level
- Examples include:
  - *Container loading*
  - *Automated putaway*
  - *Automated case pulls*
  - *Gov't compliance*
- Primary benefits:
  - *Greater visibility*
  - *Inventory accuracy*
  - *Productivity*

Printable RFID Tags Or Smart Labels

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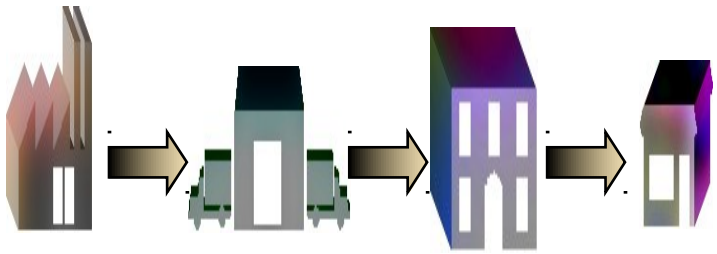
RFID Deployment Strategy

Run

- Extending functionality & visibility to customers & carriers
- Tags on cases & items (with kill switch)
- Examples include:
  - *Unit replenishment*
  - *Unit picking*
  - *Active cycle counts*
- Primary benefits:
  - *Greater visibility*
  - *Inventory accuracy*
  - *Productivity*
  - *Increased forecast accuracy*
  - *Item Serial Number Tracking*



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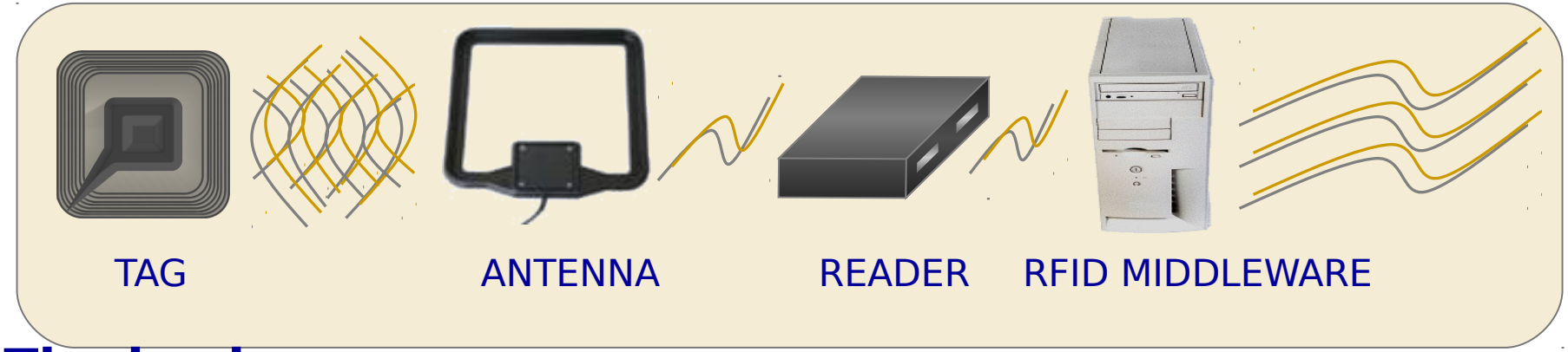
RFID Process

"RFID is simply about using radio waves to automatically identify physical items in varying proximity to readers which can uniquely identify them."



The basic process:

1. The RF Antenna broadcasts a signal
2. Tag Enters the RF field
3. RF Signal powers the Tag
4. Tag transmits data to the reader
5. Reader interacts directly with a System or Middleware to System

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World-Wide Unlicensed "RFID" Bands

Frequency	Un-licensed Operation
125 kHz	World-Wide Allocation
13.56 MHz	World-Wide Allocation
458 MHz	Singapore, U.K., Hong Kong (500 mW/45 kHz)
869 MHz	**Under Development in Europe** **CEPT/ERC/REC 70-03 E** (500 mW/250 kHz)
902 MHz to 928 MHz	North and South America, Taiwan (1 watt spread spectrum)
918 MHz to 926 MHz	Australia, New Zealand, South Africa, China (~1 watt/varying bandwidth)
2.45 GHz	World-Wide Allocation

Varies from 3 mW in Australia to 1 Watt in South Africa.

Under Petition
Europe allows 21 dB higher SB than FCC.

2.45 GHz World-Wide

U.S.	1000 mW
U.K.	100 mW
Belgium	25 mW
Finland	10 mW
France	500 mW
Israel	100 mW
Japan	230 mW
S. Korea	300 mW
Spain	100 mW
Sweden	500 mW
Most EU	500 mW

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Navy Active RFID Initiatives Comparison

	ATOS	ECT	UWB	
Business Process:	ID, Locate, & Monitor all			ID, Locate, & Monitor
	all	Tracking, Security, &	Class V Supplies	aircraft engine
	containers	Health Monitoring of	ISO Shipping Containers	
Potential Users:	Military Services	DoN		Military Services, DHS,
	DoT, USCG, TSA			
Features:				
Frequency:	433.92 MHz	916.48 MHz		6.1 – 6.6 GHz
Memory:	2 Mg	32K		1 Mg
Battery Life:	7 Years	2-4 Years		7+ Years
Fixed Read Distance:	100’	100’		80’ - 100’
Sensors:	Temperature, Humidity,	Temperature, Humidity,		Container Breech,
	Shock	Shock, Pressure	Temperature, Humidity,	Shock
Open Architecture:	Yes	Yes		Yes
ISO Standards Compliance:		No		No No
Proprietary/Non-Proprietary		Non-Proprietary		Most Non-proprietary
	Non-Proprietary			
	(Government):	LPSN Proprietary		
Limitations:	Not yet ITV Configured	Frequency not usable		Reviewing FCC ruling
	Not yet through-the-box	worldwide	ne: use of UWB on ships/	visibility
	configured	aircraft		
Production Tag Forecasted				
Cost (avg):	$25 w/sensors	$109 w/sensors		Sub $30 w/sensors

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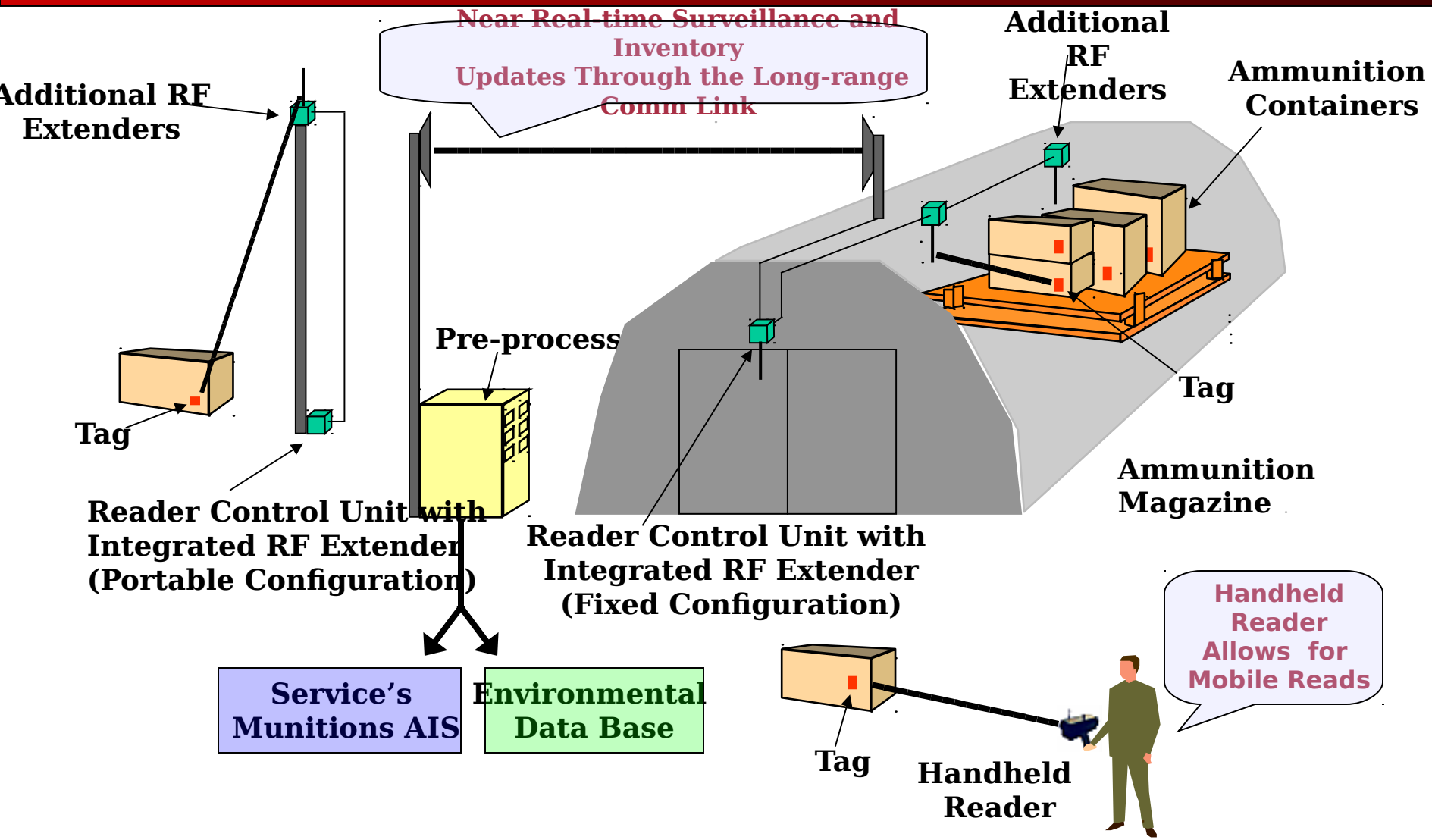
ATOS Concept



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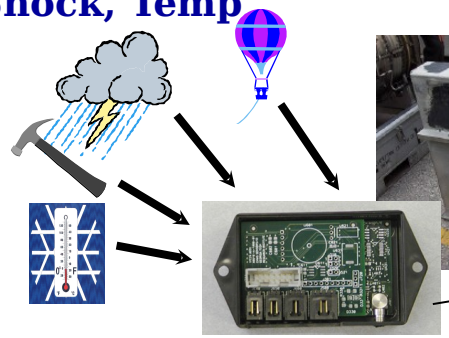
Navy Engine Container Initiative

Humidity, Pressure, Shock, Temp

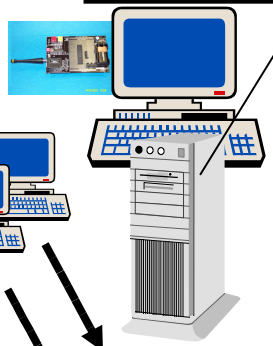


ISRFID TAG

PDA

•Local Interrogation via PDA/RF Reader

Sensor Data Sent to Computer Via Wireless



REMOTE MONITORING STATION

•Sensors to Monitor Conditions Inside Container

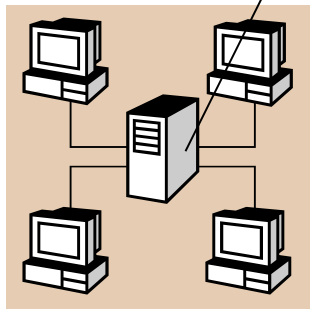
•Data Storage for Asset ID, Container ID & GTN

•Local Radio Frequency Transmission - 100ft, or 1-2 miles with use of Long Range Modem

•RMS receives daily updates from ISRFID tags within range

•RMS sends updates to the CMS, along with RMS locations

CENTRAL MONITORING STATION



•CMS is an Internet Server allowing Navy access to data collected from multiple RMS

•CMS also sends emails to the proper personnel if the the tag detects an out of tolerance condition (i.e. the humidity is rising)

•Upload capability into AEMS database

Future:

•Contact Memory Button Integration

•GPS Integration

•Cellular Communication Integration

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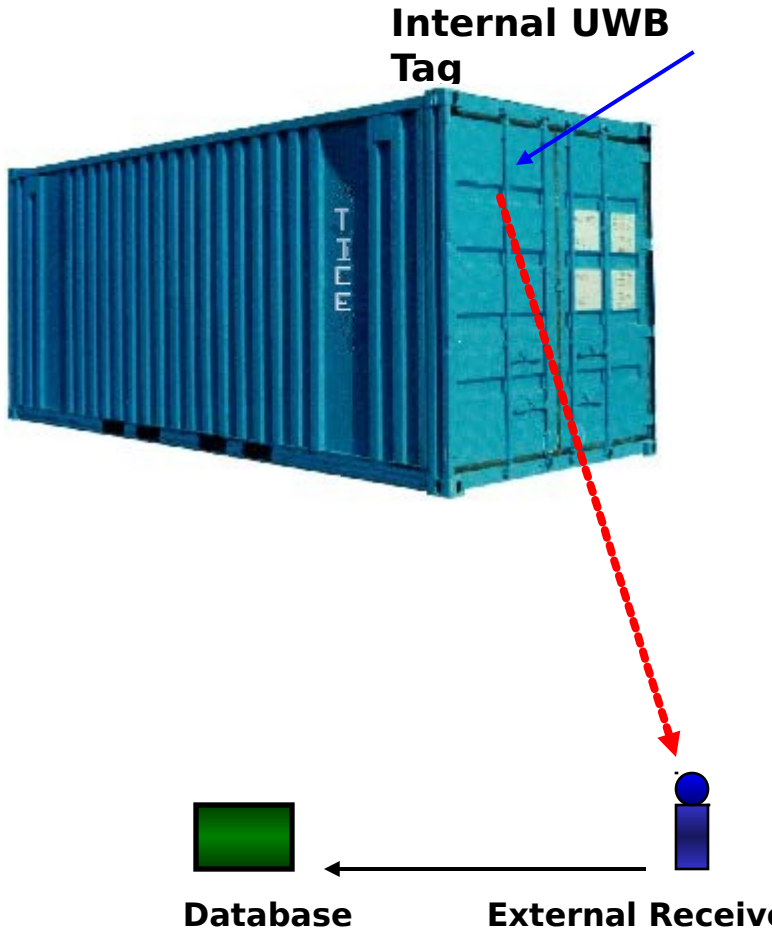
Sponsor of Ultra-Wideband (UWB) Container Tag Test

- Method for enabling communication and condition monitoring from inside of a shipping container
- Uses impulse radio wireless techniques
- Reports container assets and monitors the environment within the shipping container
- Possible use in Expeditionary Logistics – inside container content of shipments
- Commercial Standards not yet developed



Proof-Of-Concept complete…proven data file transmission and display

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Smart Stores

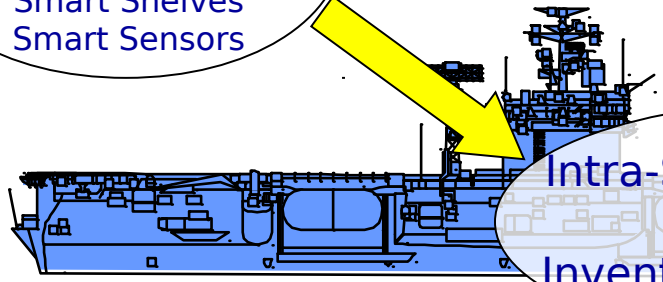
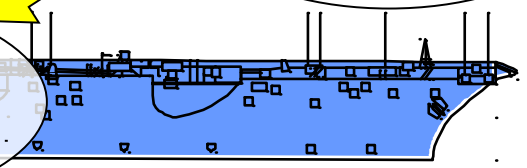
AIT
Wireless LAN
RF Data Collection
RF Identification
Smart Shelves
Smart Sensors





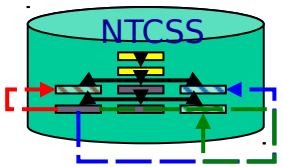

Vehicle Tag Personnel Tag Asset Tag


Machinery Control
Vertical Conveyance
Horizontal Conveyance
Autonomous Vehicles
Automated Storage/
Retrieval System
Smart Sensors

Intra-Ship Stores Handling and Inventory Tracking System

AIS
R-Supply,
NALCOMIS,
SUDAPS,
IBS, ERP,
Etc.



Business Processes
Food Service Management,
UNRep/VertRep,
Inventory, Receipt,
Stow, Issues,
Etc.

Automated Inventory
Automated Supply Processes
Reduced Crew Workload
Improved Asset Visibility
Decreased Logistic Support Cost
Reduced Total Ownership Cost
Comprehensive Integrated Solution
Cross Platform Solution (e.g. CVN, Amphib, MPFF, T-AKE)

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Fleet AIT Capability

- **Integrated Barcode System (IBS):**
  - **Receipt & Inventory management, Location audits & report generation**
  - ***Supports DoD standard barcode label generation (1D & 2D)***
  - ***Interfaces to: SUADPS-RT, RSUPPLY Force & SNAP II platforms***
  - **Developing interface with R-Supply Unit & Micro-SFM**
- ***Automated Food Service Management (FSM) on submarines for bar coded inventory***
- ***Joint Food Service with DLA***
  - **DoD moving to Commercial UPC**

- ***CBR-D Inventory Management Syste***

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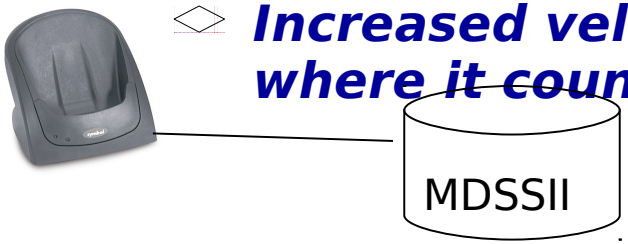
Shipboard Movement Tracking (SMT)

- Goal:_
  - *Optimize littoral strike force*
- Background:
  - *USMC needs to speed up deployment of personnel and material during operations/exercises*
  - *Currently takes too long, manpower burden*
- Objective:
  - *Using wireless AIT tools eliminate "paperwork"*
  - *Ensure accurate load out of personnel, supplies and weapons*
  - *Increased velocity - increased horse power where it counts*



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NAVSPECWARCOM & NAVFAC NCF Armory Projects

- Successfully proving the integration of access control systems & Contact Memory Buttons (CMB) technology for inventory control & information tracking
- Better visibility and accountability of sensitive items
- Reduce human error/Man-hours
- Reduce lost information
- Enable life-cycle tracking
- Improve access control
- NAVFAC leveraging existing capability:
  - *Congressional Funding ($800K) provided to AIT office to integrate/implement capability into NAVFAC AIS using CACI/Cytec initially at NCF Gulfport, MS*

Proof-Of-Concept complete…proven reduction in man-hours

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Unique Identification (UID)

- **Continued participation in OSD (AT&L) Working Groups defining marking requirements, impacts/barriers, business rules & standards – Policy signed July 03**
- **NAVICP Packaging, Handling, Storage & Transportation (PHS&T) Working Group will identify requirements to Weapons/Aviation systems managers, define parts to be marked & contracts to be modified to include Data Matrix bar code marking.**
- **Concur on OSD/DoD, International & Industry AIT compromise on data elements**
  - ***Uses 2D PDF417 or Data Matrix Bar Codes***
  - ***Incorporates mandatory ISO (ANSI M.H.10.8.2 & 3) standards***
- **Linear bar codes not affected (or optional)**
  - ***DoD position - cost prohibitive to include use of standards in current systems***
- **AIS PEO's/PM's must budget to support adoption of the Data Matrix bar code for industry interoperability – minimum 2 years out**

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UID (CONT)

- **Part Marking must address all classes of supply**
- **Policy addresses parts to be marked as:**
  - ***Parts > $5K***
  - ***Mission Critical***
  - ***Already Serially Controlled or other Controlled Inventory***
  - ***Program Manager determines Cost Benefits associated with Marking***

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Upcoming Events

SEP 29	**Naval Logistics AIT Integration Group Meeting, Arlington, VA**
OCT 1	**Defense Medical Logistics System Meeting, NAVMEDLOG, Fort Detrick, MD**
OCT 2	**PEO Carrier Summit NAVSEALOGCEN, Mechanicsburg, PA**
OCT 6-8	**USS CORONADO ONR - Technology Roundtable Demo San Diego, CA**
OCT 15-16	**Navy AIT Steering Group Meeting Mechanicsburg, PA**
OCT 27-30	**2003 D0D Maintenance Symposium King of Prussia, PA**

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Summary

- AIT crosses all functional applications & classes of supply:
  - *No one-size fits all solution*
  - *RFID one tool in the tool-kit*
- Technology is only one aspect to consider – standards, data, systems, communications, training, life cycle maintenance are some others
- Navy promotes most effective & efficient use of technology based on business process requirements & return-on-investment
- Navy supports use of RFID where it makes sense:
  - *Navy notes Joint value of RFID in theater beyond POD*
  - *Navy will continue to address & support RFID requirements for ITV*
- Navy UID & RFID Implementation Plans require stakeholder participation & commitment
- Highly encourage PEO's/PM's/System Owners to include AIT/AIS Integration in budget submissions

Policy before technology…standardization before implemen